

Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A generator-motor, comprising:

a motor (50) including a plurality of coils (~~51 to 53~~) provided corresponding to a plurality of phases and attaining a function as a motor-generator; and

a control circuit (~~20~~) controlling said motor (50); wherein

said control circuit (~~20~~) includes

a plurality of arms (~~23 to 25~~) provided corresponding to said plurality of coils (~~51 to 53~~) respectively and connected in parallel between a positive bus (~~L1~~) and a negative bus (~~L2~~), and

a first Zener diode (~~21~~) connected in parallel to said plurality of arms (~~23 to 25~~), between said positive bus (~~L1~~) and said negative bus (~~L2~~), and

each of said plurality of arms (~~23 to 25~~) includes

first and second switching elements (~~Tr1, Tr3, Tr5; Tr2, Tr4, Tr6~~) connected in series between said positive bus (~~L1~~) and said negative bus (~~L2~~), and

a second Zener diode (~~DT1 to DT3~~) connected in parallel to said second switching element (~~Tr2, Tr4, Tr6~~), between said first switching element (~~Tr1, Tr3, Tr5~~) and said negative bus (~~L2~~).

2. (Currently Amended) The generator-motor according to claim 1, wherein

said control circuit (~~20~~) is provided in a manner integrated with said motor (50).

3. (Currently Amended) The generator-motor according to claim 1, wherein said motor ~~(50)~~ starts an engine ~~(110)~~ mounted on a vehicle or generates electric power by a rotation force of said engine ~~(110)~~.

4. (Currently Amended) The generator-motor according to claim 1, further comprising an electronic control unit ~~(27 to 30)~~ outputting a control signal to a plurality of first and second switching elements ~~(Tr1, Tr3, Tr5; Tr2, Tr4, Tr6)~~ included in said control circuit ~~(20)~~, wherein

said first Zener diode ~~(21)~~ is arranged in vicinity of said electronic control unit ~~(27 to 30)~~.

5. (Currently Amended) The generator-motor according to claim 1, further comprising a fuse ~~(FU1)~~ provided closer to a DC power source ~~(10)~~ than to a positive-side connecting position of said first Zener diode ~~(21)~~.

6. (Currently Amended) A generator-motor, comprising:
a motor including a rotor ~~(55)~~ and a stator ~~(56, 57)~~ and attaining a function as a motor-generator;

first and second electrode plates ~~(81, 82A to 82C)~~ arranged on an end surface of said motor ~~(50)~~ so as to substantially form a U-shape to surround a rotation shaft of said motor ~~(50)~~;

a polyphase switching element group ~~(Tr1 to Tr6)~~ controlling a current supplied to said stator ~~(56, 57)~~; and

a control circuit ~~(26, 70)~~ controlling said polyphase switching element group ~~(Tr1 to Tr6)~~; wherein

said control circuit ~~(27, 70)~~ is provided on a ceramic substrate ~~(84)~~ arranged in a direction similar to an inplane direction of said first and second electrode plates ~~(81, 82A to 82C)~~ in a substantially U-shaped notch.

7. (Currently Amended) The generator-motor according to claim 6, wherein said control circuit ~~(27, 70)~~ is resin-molded.

8. (Currently Amended) The generator-motor according to claim 6, further comprising a Zener diode ~~(21)~~ protecting said polyphase switching element group ~~(Tr1 to Tr6)~~ against surge, wherein

said Zener diode ~~(21)~~ is arranged in said notch.

9. (Currently Amended) The generator-motor according to claim 6, further comprising a capacitive element ~~(22)~~ smoothing a DC voltage from a DC power source ~~(10)~~ and supplying the smoothed DC voltage to said polyphase switching element group ~~(Tr1 to Tr6)~~, wherein

said capacitive element ~~(22)~~ is arranged between said ceramic substrate ~~(84)~~ and said second electrode plate ~~(82A to 82C)~~.

10. (Currently Amended) The generator-motor according to claim 6, further comprising a field coil control unit ~~(40)~~ controlling current feed to a field coil ~~(54)~~ different from said stator ~~(56, 57)~~, wherein

said field coil control unit ~~(40)~~ is arranged on said ceramic substrate ~~(84)~~.

11. (Currently Amended) The generator-motor according to claim 6, wherein
a leadframe (~~86A to 86F~~) continuing to said first and second electrode plates (~~81, 82A to 82C~~) from said ceramic substrate (~~84~~) and said first and second electrode plates (~~81, 82A to 82C~~) are arranged in an identical plane.

12. (Currently Amended) A generator-motor, comprising:
a motor (~~50~~) attaining a function as a generator-motor;
a plurality of switching elements (~~Tr1 to Tr6~~) controlling a current supplied to said motor (~~50~~); and
a bus bar (~~81, 82A to 82C, 83~~) connecting said plurality of switching elements (~~Tr1 to Tr6~~); wherein
a ratio of an area of said bus bar (~~81, 82A to 82C, 83~~) to an area of said switching element (~~Tr1 to Tr6~~) is at least five.

13. (Currently Amended) The generator-motor according to claim 12, further comprising a buffer material (~~812~~) provided between said bus bar (~~81, 82A to 82C, 83~~) and said switching element (~~Tr1 to Tr6~~) and absorbing thermal expansion difference between said bus bar (~~81, 82A to 82C, 83~~) and said switching element (~~Tr1 to Tr6~~).

14. (Currently Amended) The generator-motor according to claim 12, wherein said buffer material (~~812~~) is made of a copper-based or aluminum-based material.

15. (Currently Amended) The generator-motor according to claim 12, wherein said bus bar (~~81, 82A to 82C, 83~~) is made of copper.

16. (Currently Amended) The generator-motor according to claim 12, wherein said bus bar ~~(81, 82A to 82C, 83)~~ is provided on an end surface of said motor ~~(50)~~ and has an arc shape.

17. (Currently Amended) The generator-motor according to claim 12, wherein said bus bar ~~(81, 82A to 82C, 83)~~ includes

- a first bus bar ~~(81)~~ implementing a power source line,
- a second bus bar ~~(82A to 82C)~~ connected to a coil ~~(51 to 53)~~ of said motor ~~(50)~~, and
- a third bus bar ~~(83)~~ implementing a ground line,

said plurality of switching elements ~~(Tr1 to Tr6)~~ include

- a plurality of first switching elements ~~(Tr1, Tr3, Tr5)~~ provided on said first bus bar ~~(81)~~, and
- a plurality of second switching elements ~~(Tr2, Tr4, Tr6)~~ provided on said second bus bar ~~(82A to 82C)~~, and

said generator-motor ~~(101)~~ further comprises

- a plurality of first flat electrodes ~~(91, 93, 95)~~ connecting said plurality of first switching elements ~~(Tr1, Tr3, Tr5)~~ to said second bus bar ~~(82A to 82C)~~, and
- a plurality of second flat electrodes ~~(92, 94, 96)~~ connecting said plurality of second switching elements ~~(Tr2, Tr4, Tr6)~~ to said third bus bar ~~(83)~~.